

Conference Abstract

Role of species: traits, interactions and ecosystem services

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Abstract

Understanding the role that species play in their environment is a fundamental goal of biodiversity research, bringing knowledge on ecosystem maintenance and in provision of ecosystem services. Different types of interaction that different species establish with their partners regulate the functioning of ecosystems (McCann 2007). Interactions between plants and pollinators (Potts et al. 2016) and between plants and seed dispersers (Wang and Smith 2002) are examples of mutualism, crucial to the maintenance of the floristic composition and overall biodiversity in different biomes. They also illustrate well the nature's contribution to people, supporting ecosystem services with key economic consequences, such as pollination of agricultural crops (Klein et al. 2007) and seed dispersal of natural or assisted restoration of degraded areas (Wunderle 1997).

Interactions are mediated by different functional traits (morphological and/or behavioral characteristics of organisms that influence their performance) (Ball et al. 2015). As the zoochorous transfer of pollen grains and seeds usually involves contact, the success of pollination and seed dispersal depends to a large extent on the relationship of size and morphology between flower/fruit and their respective pollinator/seed disperser. Selected over a long history of shared evolutionary history, it is feasible to rely on the predictive

potential these traits may have to determine if a certain animal is able to transfer pollen grains and/or seeds of specific plants in the landscape (Howe 2016).

Biodiversity is facing constant negative impacts, especially related to climate and habitat changes. They are threatening the provision of ecosystem services, jeopardizing the basic premise of sustainable development, which is to guarantee resources for future generations. The novel landscapes that result from these impacts will certainly be dependent of these ecosystem services, but will they persist in face of extinctions and invasive competitors? Ultimately, will these services be predictable by functional traits, in landscapes where shared evolutionary history is reduced? Strategies that help our understanding of the interactions and their role in the provision of services are urgent (Corlett 2011). Given this context, our objective here is to present the type of data that, if made available, could assist in determining the role of species in terms of the interactions they make and the provision of ecosystem services. Moreover, we aimed to elucidate how this role can be associated with functional traits.

The current work focuses on the following groups: plants, birds, bats and bees (Fig. 1). Of particular interest are interactions involving:

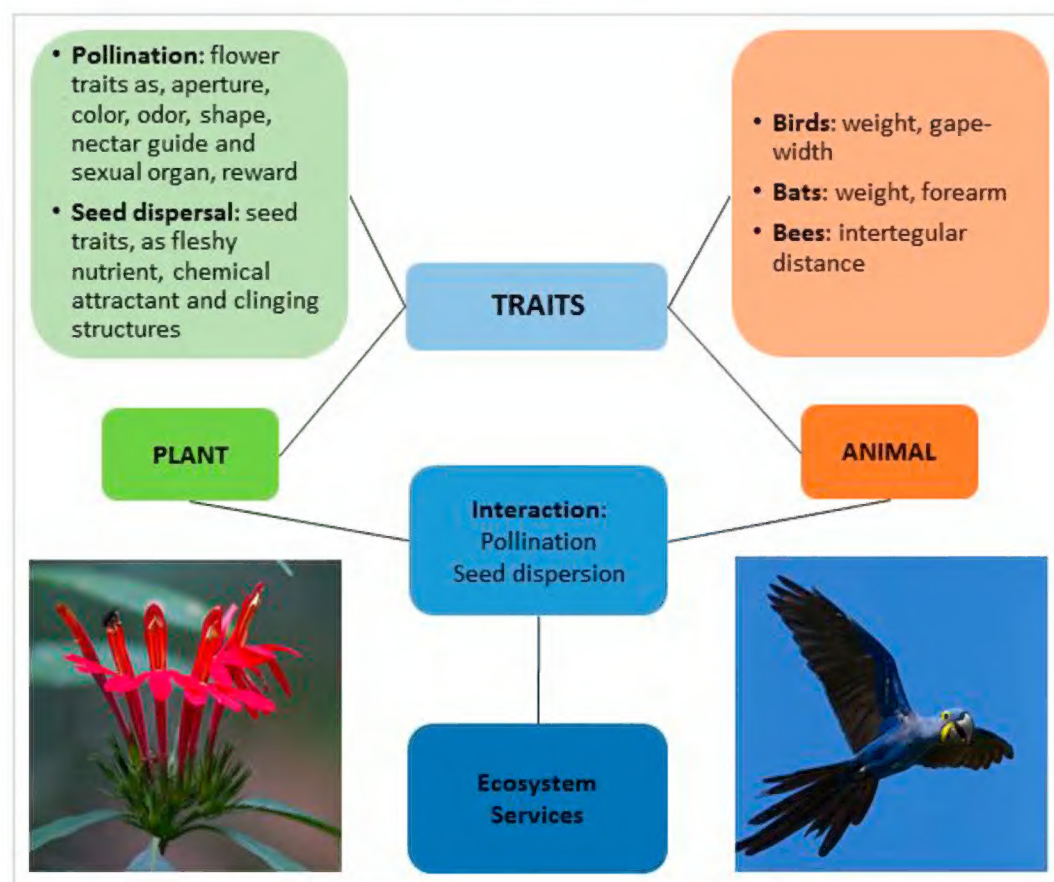


Figure 1.

Interaction and ecosystem services of birds, bats and bees mediated by functional traits (Photos: João Marcos Rosa).

1. pollination, which is carried out predominantly by bees, but also by nectarivorous birds and bats; and
2. seed dispersal, mainly carried out by frugivorous birds and bats.

These interactions are mediated by key traits. In plants, common flower traits are the aperture, color, odor strength and type, shape orientation, size and symmetry, nectar guide and sexual organ, and reward. Fruit or seed traits, such as fleshy nutrient, chemical attractant and clinging structures, are also relevant for seed dispersal. In animals the most common traits are the body size (for bees, the intertegular distance; for bats, forearm length; and for birds, the weight), gape-width for birds and the feeding habit (nectarivorous, frugivorous, omnivorous) for bats and birds. Providing standardized data on traits involving interactions between fauna and flora is important to fill knowledge gaps, which could help in the decision making processes aiming conservation, restoration and management programs for protecting ecosystem services based on biodiversity.

Keywords

biodiversity, pollinator, seed disperser, functional traits, body size, ecology

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